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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAVARIAS, ARNEL C	
ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/066,189	MLEJNEK, MICHAL	
	Examiner	Art Unit	
	Arnel C. Lavarias	2872	

-- The MAILING DATE of this communication appears on the cov r sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/2/02, 6/7/02, 1/13/03, 6/27/03* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) *15-29 and 43-55* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14, 30-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 June 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5, 6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Invention I, Claims 1-14, 30-42, in Paper No. 8, dated 6/27/03, is acknowledged.

2. Claims 15-29, 43-55 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 8, dated 6/27/03.

Information Disclosure Statement

3. The information disclosure statement filed 5/2/02 in Paper No. 5 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. A copy of the 'Handbook or Optics' reference was not found with the submitted information disclosure statement.

Drawings

4. The corrected or substitute drawings were received on 6/7/02 in Paper No. 4. These drawings are acceptable.

Specification

5. The disclosure is objected to because of the following informalities:

Page 2, lines 11 and 12- 'ΔL' does not show up in Equations 1 and 2 on Page 1

Page 2, line 14- 'Δn' does not show up in Equations 1 and 2 on Page 1

Page 5, line 26- the sentence beginning "The mask blank may..." is incomplete

Page 7, line 4- 'a' should read 'an'.

Appropriate correction is required.

Claim Objections

6. Claims 40-42 are objected to because of the following informalities:

Claims 40-42 recite the limitation "the device pattern" in line 1 of each of Claims 40-42. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-14, 30-42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims recite the limitation that the optical component transmission variation is a function of at least one physical characteristic of the optical transparent component, the at least one physical characteristic being birefringence, refractive index inhomogeneity, or thickness variation of the optical transparent component. Equations 1 and 2 on Page 1 of the specification of the disclosure provide the standard transmission characteristic for a Fabry-Perot interferometer. However, the specification of the disclosure fails to describe exactly how the birefringence (Δn as defined on Page 2 of the specification), refractive index inhomogeneity, or the thickness variation of the optical transparent component (ΔL as defined on Page 2 of the specification) affect the standard transmission characteristic for a Fabry-Perot interferometer. The Examiner notes that Equations 1 and 2 only specifically show the transmission characteristic as being a function of refractive index (n) and thickness (L), and the specification of the disclosure is unclear regarding the supposed effects of birefringence, refractive index inhomogeneity, or thickness variation of the optical transparent component on the transmission characteristic. The Examiner additionally notes that the specification defines Δn as birefringence on Page 2, however, Tables I and II on Page 6 list Δn as refractive index inhomogeneity.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1, 3-11, 14, 30-36, 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Otani et al. (U.S. Patent No. 6472087).

Otani et al. discloses an optical device (See col. 4, line 5-col. 6, line 59) comprising an optical transparent component (See for example quartz or fluorite substrates in Examples 1-7) characterized by a component light transmission variation, the component transmission variation being a function of at least one physical characteristic of the optically transparent component substrate (the quartz substrate has a transmission that varies based on multiple factors, including its thickness, refractive index, absorption characteristics, scattering characteristics, etc.); and an anti-reflective coating (See anti-reflection layers in Examples 1-7) disposed on a first side of the optically transparent component, the anti-reflective coating including at least one layer of material such that the optical device transmission variation is less than the component transmission variation (See further below regarding the Fabry-Perot interference effect). Otani et al. additionally discloses the anti-reflective coating including a plurality of layers, at least one of the layers being Al_2O_3 (See for example Table 1) and MgF_2 (See for example Table 1), and the optically transparent component being quartz glass (See for example Table 1). The Examiner notes that transparent plane parallel substrates inherently have a light transmission variation that is due to the Fabry-Perot interference effect (See Equations 1 and 2 in the Applicant's disclosure, which are well known in the art), and

that the light transmission variation due to the Fabry-Perot interference effect will inherently be a function of both the refractive index of the substrate, the thickness of the substrate (i.e. the distance between the two flat faces of the substrate), and any parameter that affects these two values, such as substrate surface roughness, changes in the bulk refractive index of the substrate, birefringence, temperature, stress, strain, etc.

11. Claims 1, 3-11, 14, 30-36, 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Levinson et al. (U.S. Patent Application Publication US2002/0132171A1), of record.

Levinson et al. discloses an optical device (See paragraphs 0031-0055) comprising an optical transparent component (See for example paragraph 0031) characterized by a component light transmission variation, the component transmission variation being a function of at least one physical characteristic of the optically transparent component (the quartz substrate has a transmission that varies based on multiple factors, including its thickness, refractive index, absorption characteristics, scattering characteristics, etc.); and an anti-reflective coating (See for example paragraphs 0032-0038) disposed on a first side of the optically transparent component, the anti-reflective coating including at least one layer of material such that the optical device transmission variation is less than the component transmission variation (See further below regarding the Fabry-Perot interference effect). Otani et al. additionally discloses the anti-reflective coating including a plurality of layers, at least one of the layers being Al_2O_3 (See for example paragraph 0031) and MgF_2 (See for example paragraph 0031), and the optically transparent component being quartz glass (See for example paragraph 0031). The Examiner notes that transparent plane parallel substrates inherently have a light

transmission variation that is due to the Fabry-Perot interference effect (See Equations 1 and 2 in the Applicant's disclosure, which are well known in the art), and that the light transmission variation due to the Fabry-Perot interference effect will inherently be a function of both the refractive index of the substrate, the thickness of the substrate (i.e. the distance between the two flat faces of the substrate), and any parameter that affects these two values, such as substrate surface roughness, changes in the bulk refractive index of the substrate, birefringence, temperature, stress, strain, etc.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 2, 12-13, 37-38, 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otani et al.

With regard to Claim 2, Otani et al. discloses the invention as set forth above in Claim 1, except for the optical device transmission variation being equal to approximately one-sixth the component transmission variation. However, it is well known in the art of multilayer dielectric thin film fabrication to adjust the various characteristics of the layers comprising the anti-reflection film (i.e. number, physical/optical thicknesses, and the refractive indices of the films) to reduce/eliminate the Fabry-Perot interference effect in the reflectance/transmittance output of the optical transparent component of the optical

device as well as to adjust the total reflectance/transmittance output of the optical device. Additionally, one skilled in the art would be able to adjust such parameters to achieve a desired reduction in the Fabry-Perot interference effect, such as a reduction of one-sixth, as recited in Claim 2. One would have been motivated to do this to reduce/eliminate wavelength and intensity variations in the transmitted output of the optical device, particularly when the source wavelength drifts, i.e. due to time, temperature, etc., as well as reduce light loss through the optical device.

With regard to Claims 12-13, 37-38, Otani et al. discloses the invention as set forth above in Claims 1 and 30, except for the optically transparent component being comprised of fused silica. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optically transparent component to be comprised of fused silica, since it has been held to be within the ordinary skill of worker in the art to select a known material on the basis of its suitability for the intended use. One would have been motivated to have the optically transparent component be comprised of fused silica for the purpose of taking advantage of fused silica's extremely high transmissivity characteristics over the wavelength band from the UV to the IR, as well as take advantage of fused silica's very low thermal expansion coefficient. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

With regard to Claims 40-42, Otani et al. discloses the invention as set forth above in Claim 30, except for the device pattern corresponding to one of an electronic circuit, a MEMs structure, or an optical component. It is well known in the art of photolithography to utilize anti-reflection films, such as those disclosed by Otani et al., on photomasks for

photolithography systems, wherein the photomasks include device patterns for devices such as an electronic circuit, a MEMs structure, or an optical component. One would be motivated to have the device pattern correspond to one of an electronic circuit, a MEMs structure, or an optical component for the purpose of providing a suitable device pattern based on the intended use of the photomask and the intended device to be fabricated.

14. Claims 2, 12-13, 37-38, 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levinson et al., of record.

With regard to Claim 2, Levinson et al. discloses the invention as set forth above in Claim 1. Levinson et al. further discloses that the optical device transmission variation (i.e. the transmission due to both the substrate and the anti-reflection film) is reduced to 0.3% in the UV (approximately 235-292 nm range) and is reduced at least 50% in the visible range (approximately 600-800 nm range) (See for example paragraph 0038). Levinson et al. lacks the optical transmission variation being equal to approximately one-sixth the component transmission variation. However, it is well known in the art of multilayer dielectric thin film fabrication to adjust the various characteristics of the layers comprising the anti-reflection film (i.e. number, physical/optical thicknesses, and the refractive indices of the films) to reduce/eliminate the Fabry-Perot interference effect in the reflectance/transmittance output of the optical transparent component of the optical device as well as to adjust the total reflectance/transmittance output of the optical device. Additionally, one skilled in the art would be able to adjust such parameters to achieve a desired reduction in the Fabry-Perot interference effect, such as a reduction of one-sixth, as recited in Claim 2. One would have been motivated to do this to reduce/eliminate

wavelength and intensity variations in the transmitted output of the optical device, particularly when the source wavelength drifts, i.e. due to time, temperature, etc., as well as reduce light loss through the optical device.

With regard to Claims 12-13, 37-38, Levinson et al. discloses the invention as set forth above in Claims 1 and 30, except for the optically transparent component being comprised of fused silica. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optically transparent component to be comprised of fused silica, since it has been held to be within the ordinary skill of worker in the art to select a known material on the basis of its suitability for the intended use. One would have been motivated to have the optically transparent component be comprised of fused silica for the purpose of taking advantage of fused silica's extremely high transmissivity characteristics over the wavelength band from the UV to the IR, as well as take advantage of fused silica's very low thermal expansion coefficient. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

With regard to Claims 40-42, Levinson et al. discloses the invention as set forth above in Claim 30, except for the device pattern corresponding to one of an electronic circuit, a MEMs structure, or an optical component. It is well known in the art of photolithography to utilize anti-reflection films, such as those disclosed by Levinson et al., on photomasks for photolithography systems, wherein the photomasks include device patterns for devices such as an electronic circuit, a MEMs structure, or an optical component. One would be motivated to have the device pattern correspond to one of an electronic circuit, a MEMs structure, or an optical component for the purpose of providing a suitable device

pattern based on the intended use of the photomask and the intended device to be fabricated.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pedrotti et al. (F. L. Pedrotti, L. S. Pedrotti, 'Introduction to Optics', Prentice Hall, New Jersey, 1993, pp. 391-404.).

Pedrotti et al. is being cited to evidence the well known theory behind multilayer thin films, and in particular the theory behind single-layer and multiple-layer anti-reflection thin films (See in particular pages 396-401).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 703-305-4007. The examiner can normally be reached on M-F 8:30 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 703-305-0024. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

Arnel C. Lavarias
August 12, 2003

Audrey Chang
Primary Examiner
Technology Center 2800